S.C.

Notice of Allowability	Application No.	Applicant(s)	
	09/974,637	AGARWAL, ASHOK K.	
	Examiner	Art Unit	
	Krishnan S Menon	1723	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to *RCE of 7/22/04*.

2. ☒ The allowed claim(s) is/are *12-15,18-21,25 and 27-33; RENUMBERED 1-16*.

3. ☐ The drawings filed on _____ are accepted by the Examiner.

4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
   a) ☐ All b) ☐ Some* c) ☐ None of the:
      1. ☐ Certified copies of the priority documents have been received.
      2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
      3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.

6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
      1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
   (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____ .
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

EXAMINER'S AMENDMENT

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Derek Mason, attorney for the applicant, on 8/25/04.

The application has been amended as follows:

Claims are amended as follows (starting on a fresh page):

IN THE CLAIMS:

1. (cancelled)

2. (cancelled)

3. (cancelled)

4. (cancelled)

5. (cancelled)

6. (cancelled)

7. (cancelled)

8. (cancelled)

9. (cancelled)

10. (cancelled)

11. (cancelled)

12. (Currently Amended): A filtration membrane for separating a contaminant from a feed fluid to produce a product fluid, said membrane comprising:

a porous substrate having a first surface; and

a product fluid-permeable layer cast on said first surface of said porous substrate, said layer comprising the interfacial polymerization reaction product of an aqueous amine solution and an acyl halide solution, wherein

said aqueous amine solution is prepared from a propionic salt, an amine, and water, and

said acyl halide solution includes an acyl halide and an organic solvent, and

wherein the filtration membrane exhibits about 98% to 99.5% magnesium sulfate rejection and fluid fluxes of about 70 to 100 gallons/ft^2 per day for an aqueous magnesium sulfate solution at about 2000 ppm at about 100 psi and about 77° Fahrenheit.

13. (Original) The filtration membrane according to claim 12, wherein said layer has pores of a size suitable for nanofiltration.

14. (Original) The filtration membrane according to claim 12, wherein said layer has pores of a size suitable for reverse osmosis filtration.

15. (Previously presented) The filtration membrane according to claim 12, wherein said amine is one of piperazine and m-poly(phenylenediamine).

16. (cancelled)

17. (cancelled)

18. (Previously presented) The filtration membrane according to claim 12, wherein said acyl halide is selected from the group consisting of trimesoyl chloride, cyclohexane-1,3,5-tricarbonyl chloride, isophthaloylchloride, and tetraphthaloyl chloride.

19. (Previously presented) The filtration membrane according to claim 12, wherein said organic solvent is immiscible in water.

20. (Previously presented) The filtration membrane according to claim 19, wherein said organic solvent is naphtha.

21. (Original) The filtration membrane according to claim 12, wherein said porous substrate is comprised of polysulfone.

22. (cancelled)

23. (cancelled)

24. (cancelled)

25. (Previously presented): The filtration membrane of claim 12, wherein the aqueous amine solution is prepared by first mixing the propionic salt with the water and then adding the amine.

26. (Cancelled)

27. (Currently Amended) A method for producing a filtration membrane, the method comprising:

mixing a proprionic salt, an amine, and water to prepare an aqueous amine solution,

applying the aqueous amine solution to a surface of a porous substrate to prepare a wetted substrate, and

contacting the wetted substrate along an interface with an acyl halide solution including an acyl halide and an organic solvent,

wherein polymerization occurs at the interface;

wherein the filtration membrane exhibits about 98% to 99.5% magnesium sulfate rejection and fluid fluxes of about 70 to 100 gallons/ft^2 per day for an aqueous magnesium sulfate solution at about 2000 ppm at about 100 psi and about 77° Fahrenheit.

28. (Previously presented): The method according to claim 27, wherein the amine is one of piperazine and m-poly(phenylenediamine).

29. (Previously presented): The method according to claim 27, wherein the acyl halide is trimesoyl chloride.

30. (Previously presented): The method according to claim 27, wherein the organic solvent is naphtha.

31. (Previously presented): The method according to claim 27, wherein the porous substrate is comprised of polysulfone.

32. (Previously presented): The method according to claim 27, further including drying said membrane after said polymerization has occurred.

33. (Previously presented): The method according to claim 27, wherein the propionic salt is mixed with the water prior to mixing in the amine.

34. (Cancelled)

Reasons for Allowance

The following is an examiner's statement of reasons for allowance:

The closest prior arts are Koo et al (US 6,245,234 B1) and Chau (US 4,950,404). Koo teaches a nanofiltration or reverse osmosis membrane and a method of producing such a membrane by interfacial polymerization of an acyl halide and a polyamine in presence of propionic acid and/or its salts. However, the membrane prepared does not exhibit the high MgSO4 rejection along with the very high flux as claimed. Chau also teaches a membrane and a process of making NR/RO membranes in presence of organic acids, but not specifically propionic acid salts, and Chau membrane also does not provide such high MgSO4 rejection combined with high flux as claimed. It would also be not obvious to one of ordinary skill in the art from these references either alone or in combination with others to arrive at the formulation claimed and predict that such high MgSO4 rejection would be possible with such high flux, because none of the references suggest high rejection of MgSO4 with the flux range as claimed.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Krishnan S Menon whose telephone number is 571-272-1143. The examiner can normally be reached on 8:00-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wanda L Walker can be reached on 571-272-1151. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Krishnan Menon
Patent Examiner

W. L. WALKER
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